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“Development on the margin”

## The Principle of Vector Competence of Western Flower Thrips (*Frankliniella occidentalis*) in the Transmission of Tomato Spotted Wilt Virus

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### Abstract

The complex and specific interplay between thrips, tospovirus and their shared host plant, has led to outbreaks of crop disease epidemics of economic and social importance. The exact details of the processes promoting the vector-virus-host interaction and their coordinated evolution, increases our understanding of the general principles involved in pathogen transmission by insects, which can then be exploited to develop sustainable strategies for

controlling the spread of the virus through plant populations. In this study, the model systems *Frankliniella occidentalis* and Tomato spotted wilt virus (TSWV) were used to examine more in detail the influence of TSWV on the *F. occidentalis* vector competence, as well as the contribution of *F. occidentalis* behaviour pattern and sex biasness in promoting vector competence.

Thrips were reared on either infected or uninfected *Capsicum annuum* leaflet throughout their larval stages, and later transferred individually on healthy leaf disks for further experiments. The exposure to TSWV improved the fitness of the WFT in regard to longevity and survival, with mean longevity being higher in exposed thrips compared to unexposed. 15-day mortality test showed low rates of mortality in exposed as opposed to unexposed thrips. The results also showed a reduction in mean daily fecundity as well as lifetime fecundity in the exposed

compared to unexposed on uninfected leaf disks. Choice test towards infected and uninfected host plants showed significantly higher preference of adult WFT to the infected plant over the uninfected. This suggests that the nutritional situation for the developing larvae would be better on the infected plants and is a determinant for the fitness of the adults. The ongoing and future work is envisaged to give a clear understanding into the plant-vector-virus interaction, which is essential for accurate diagnosis and control of the TSWV epidemic, as well as the control of *F. occidentalis* as crop pest.

**Keywords:** *Capsicum annuum*, *Frankliniella occidentalis*, thrips, tomato spotted, tospovirus, vector competence, wilt virus (TSWV)